

The validation of the Polish version of the Posttraumatic Diagnostic Scale and its factor structure

Małgorzata Dragan¹, Maja Lis-Turlejska^{2*}, Agnieszka Popiel², Szymon Szumiał³ and Wojciech Ł. Dragan¹

¹Faculty of Psychology, University of Warsaw, Warsaw, Poland; ²Faculty of Psychology, Warsaw School of Social Sciences and Humanities, Warsaw, Poland; ³Środowiskowy Dom Samopomocy, Local self-help home for mentally ill people, Minsk Mazowiecki

Background: Posttraumatic Diagnostic Scale (PDS) is a self-descriptive measure developed to provide information regarding posttraumatic stress disorder (PTSD) diagnosis and symptom severity.

Objectives: The aim of this article is to report on the validation of the Polish version of PDS and to test its factor structure with reference to two models: an original three-factor model (Reexperiencing, Avoidance, and Arousal) and alternative five-factor model (Reexperiencing, Avoidance, Numbing, Dysphoric Arousal, and Anxious Arousal).

Method: The validation procedure included three studies conducted on samples of separate populations: university-level students ($n = 507$), individuals who had experienced various traumas ($n = 320$), and treatment-seeking survivors of motor vehicle accidents (MVA) ($n = 302$). Various other measures of trauma-related psychopathology were administered to participants, as well as the PTSD module of the Structured Clinical Interview (SCID) in the case of MVA patients.

Results: PDS showed high internal consistency and test-retest reliability, good diagnostic agreement with SCID, good sensitivity but relatively low specificity. The satisfactory convergent validity was supported by a large number of significant correlations with other measures of trauma-related psychopathology. Confirmatory factor analysis (CFA) generally confirmed both the three-factor structure and the alternative five-factor structure of the questionnaire.

Conclusions: The results show generally good psychometric properties of the Polish version of PDS.

Keywords: *posttraumatic stress disorder; PDS; questionnaire; validity; reliability; factor analysis*

For the abstract or full text in other languages, please see Supplementary files under Reading Tools online

Received: 3 April 2012; Revised: 8 July 2012; Accepted: 16 July 2012; Published: 9 August 2012

Among the large number of assessment tools being used in the traumatic stress field (e.g., see www.ptsd.va.gov), the Posttraumatic Stress Diagnostic Scale (PDS¹; Foa, 1995) remains a unique one. Being a self-reporting measure designed for adults, it assesses the experience of a traumatic event (Criterion A), as well as all other DSM-IV (American Psychiatric

Association, 1994) criteria, including symptom duration (Criterion E), and symptom effects upon daily functioning (Criterion F). Regarding Criteria B, C, and D, it provides a measure both of posttraumatic stress disorder (PTSD) symptom presence and symptom severity. PDS is recommended for use in clinical or research settings to measure the severity of PTSD symptoms related to a single identified traumatic event (Foa, Cashman, Jaycox, & Perry, 1997). The value of this tool is based on it being widely used internationally, enabling data comparisons.

¹While some authors employ the abbreviation PTDS, PDS is the abbreviation currently used by original instrument's authors (see www.ncptsd.va.gov)

Besides the original version (Foa, 1995; Foa et al., 1997), there are several translations with published information regarding psychometric properties. They include translations into Spanish (Novy, Stanley, Averill, & Daza, 2001), Bosnian (Powell & Rosner, 2005), German (Griesel, Wessa, & Flor, 2006), Somali (Odenwald et al., 2007), Arabic (Norris & Aroian, 2008), French (Hearn, Ceschi, Brillion, Fürst, & Van der Linden, 2011), and Turkish (see Karanci et al., 2012).

The original study by Foa et al. (1997) covered 264 participants exposed to trauma. At the initial assessment, symptom severity total score was 23.41 ($SD=14.68$), and scores for the individual subscales were: Reexperiencing: 6.38 ($SD=4.35$), Avoidance: 9.23 ($SD=6.60$), and Arousal: 7.80 ($SD=5.01$). The scale demonstrated high internal consistency and good stability. Alpha coefficients for PTSD symptom severity were: Total score = 0.92; Reexperiencing: 0.78, Avoidance: 0.84, Arousal: 0.84. It was also demonstrated that each cluster comprises symptoms that measure a unified construct. The correlations among the three clusters and the total PDS score ranged from 0.73 to 0.94, and all were statistically significant at $p < 0.001$. The convergent validity of PTSD diagnoses obtained from PDS was assessed by comparing these with the ones obtained from Structured Clinical Interview (SCID), resulting in a kappa of 0.65 between the PDS and SCID, with 82% agreement between the two measures. The sensitivity of the PDS was 0.89, and its specificity was 0.75. All these results indicated satisfactory agreement between PDS and SCID. Moreover, the correlational patterns obtained in the original study supported the concurrent validity of the Intrusion and Avoidance subscales (Foa et al., 1997).

The 17 PDS symptom items relating to the specific items describing PTSD symptoms in the empirical research do not precisely reflect the three-cluster model from DSM-IV. Powell and Rosner (2005) reported that after submitting the items from the Bosnian version of PDS symptom subscales to exploratory factor analysis (EFA), the three DSM-IV scales turned out to be broadly identified, except that the three DSM-IV avoidance items loaded on the arousal scale. The authors of the German adaptation of PDS (Griesel et al., 2006) investigated the underlying factor structure of PDS with EFA using the sample of 143 trauma survivors. A three-factor structure was found: Reexperiencing/Avoidance, Emotional Numbing/Hyperarousal, plus a further factor, consisting of Hypervigilance and an Exaggerated Startle Response. The authors of the French adaptation (Hearn et al., 2011) performed confirmatory factor analysis (CFA) on data from 287 community members. They evaluated the three-factor solution and two four-factor models by King, Leskin, King, and Weathers (1998) and Simms, Watson, and Doebbell (2002). The results

showed that the data fit to the DSM-IV model were unacceptable, and that both four-factor models demonstrated a good fit. However, the Simms et al. (2002) model with the factors Intrusion, Avoidance, Dysphoria, and Hyperarousal showed the best fit. Similar results were previously obtained by Baschnagel, O'Connor, Colder, and Hawk (2005), who compared seven alternative models for PTSD using a sample of 528 undergraduate students after the September 11, 2001, terrorist attacks. However, in a study using a sample of 252 woman victims of domestic violence, conducted by Elhai et al. (2011) in order to improve the general PTSD model fit, it was found that a five-factor model with separated dysphoric arousal symptoms showed a significantly better fit than two four-factor models, despite these having received the most empirical support in previous CFA studies (see a meta-analysis by Yufik & Simms, 2010). The five-factor structure was also found to be the best model for acute stress disorder in CFA study conducted by Hensen, Armour, and Elklit (2012).

General information concerning the study of a Polish version of the PDS

The purpose of our study was to assess the psychometric properties of a Polish version of the PDS. In addition, we aimed to examine its factor structure with reference to the original three-factor model (in line with the DSM-IV criteria) and the newest Elhai et al.'s (2011) five-factor model: Reexperiencing, Avoidance, Numbing, Dysphoric Arousal, and Anxious Arousal. The PDS was translated into Polish by three independent translators, the final version was prepared by Dragan and Lis-Turlejska, and the back-translation was corrected and approved by Prof. Edna Foa. Subsequently, in 2004, we commenced data collection to validate the Polish translation of the PDS. The possibility of assessing all the required psychometric properties, including the convergent validity indices, was at that time restricted by lack of Polish version of SCID or any other appropriate interview-based diagnostic tool to measure PTSD. The Polish versions of measures necessary for assessing concurrent validity also appeared gradually over a space of several years. In the event, data gathering became a multi-stage process, and we are therefore presenting data gathered in three separate studies. Study 1 was performed on the group of university-level students; Study 2 included individuals exposed to various traumatic events; Study 3 was performed on subjects participating in a treatment program for motor vehicle accident (MVA) victims. The general aim was to compare the results obtained from these different samples.

All the subjects recruited to the three studies participated voluntarily and gave fully informed consent. The studies were approved by the Research Ethics

Committees at the University of Warsaw. Questionnaires were completed anonymously. Participants in Studies 1 and 2 completed the questionnaires collectively in a group format, or else individually, and returned them in sealed envelopes. Studies were conducted by the authors or else, under supervision, by graduate students undergoing training in clinical psychology. In addition to the Polish version of PDS, other self-descriptive measures of posttraumatic symptoms and psychopathology were used. However, for the reasons described above, different packages of measures were used in the case of each of the samples. Thus, we are presenting data in which different subsamples of participants completed different packages of questionnaires. The number of participants (n) completing the various questionnaires is shown in Tables 2 and 3.

Analysis

The software packages PASW Statistics 17.0 (SPSS Inc., 2009) and AMOS 17.0 (Arbuckle, 2008) were used to analyze the data. Questionnaires with data missing were not included. Significance level was set at $p < 0.01$. For descriptive purposes, we have employed percentages, means, and standard deviations. Test–retest reliability was assessed using kappa as a chance-corrected measure of agreement. Pearson's correlation was also calculated to examine test–retest reliability, both for the number and for the severity of posttraumatic symptoms. Scott and Wertheimer's method for examining stability reliability was additionally applied. Cronbach's alpha was calculated to test for internal consistency, and Pearson's correlation to test for convergent or discriminant validity. CFA was applied, using the maximum likelihood method. In order to improve model fit, we allowed for intercorrelations between items entering the same factor. In accordance with the recommendations formulated for CFA (see Tabachnick & Fidell, 2007), various indicators of goodness-of-fit were taken into account. In addition, in Study 3 we obtained information on the diagnostic agreement between the PDS and a structured diagnostic interview, as well as information on the sensitivity, specificity, and predictive values of this test.

Study 1

The main goal of Study 1 was to test the psychometric properties and factor structure of the Polish version of PDS in a non-clinical sample. For this purpose, we recruited a sample of 507 students from various universities in Warsaw; their ages ranged from 17 to 29 years ($M = 20.84$, $SD = 2.47$), their fields of study included technology, musicology, applied linguistic, pedagogy, and psychology. Of the sample, 332 members were women (65.5%, mean age = 20.89, $SD = 2.36$) and 175 were men (34.5%, mean age = 20.74, $SD = 2.67$); 26.4% of partici-

pants marked a serious accident, fire, or explosion as the most bothering traumatic event in their life (PDS, Part 2). The prevalence of other most bothering events was as follows: non-sexual assault committed by a stranger (20.3%), non-sexual assault committed by a non-stranger (18.9%), life-threatening illness (13.8%), and other traumatic events (6.3%). Each of the remaining events was prevalent at a level not exceeding 5%. Of the participants, 11.4% ($n = 58$) met all PTSD criteria according to PDS.

Method

Study 1 was carried out over the period 2005–2008. In addition to PDS, the following scales were administered:

Impact of Events Scale (IES) (Horowitz, Wilner, & Alvarez, 1979) in the Polish version was prepared by Lis-Turlejska and Łuszczynska-Cieślak. IES has been applied in virtually every type of traumatization, and has been translated into many languages. The internal consistency of the Polish version was examined, for example, in a sample of 440 students; the value for α was 0.92 (Lis-Turlejska, 2004). Because IES is exposure-specific, we instructed the patients to refer to the traumatic event, which they chose from the events they previously marked in the PDS (the Most Bothering Event – PDS, Part 2).

Beck Depression Inventory (BDI) (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) is one of the most widely used self-reporting questionnaire to detect symptoms of depression, and to evaluate its severity. It consists of 21 questions related to possible depression symptoms. The Polish translation was performed by Lewicka and Czapiński (see Czapiński, 1998).

General Health Questionnaire-28 (GHQ-28) is a tool used to assess the impact of traumatic stress on general mental health. GHQ-28 is a longer version of GHQ-12, a short screening tool to detect psychiatric disorders. The two versions have comparable psychometric properties; they measure depressive, anxiety, and somatic symptoms. The full Polish adaptation of GHQ-28 also has very good psychometric properties (Goldberg, Williams, Makowska, & Merez 2001).

Nottingham Health Profile (NHP) is a valid and reliable tool developed by Hunt, McEwen and McKenna (McEwen, 1988), in the Polish adaptation by Wrześniewski (2000). The questionnaire consists of two parts. The first part deals with currently experienced health-related problems; the second part covers the influence of the current health condition upon different aspects of life.

All the participants completed PDS and IES. In addition, BDI, GHQ-28, and NHP were administered to subsamples of them (Table 2). Moreover, PDS was readministered to a student sample subgroup ($n = 56$) within the test–retest procedure, with a four-week

interval. Participant anonymity was preserved through the use of special coding, enabling identification of two questionnaires from the same participant. The analysis revealed no statistically significant differences in socio-demographic variables between the retest group and the total student group.

Results

Reliability and validity

A kappa value of 0.72 was obtained using the retest sample. The agreement level between diagnoses at the two time points amounted to 78%, indicating a satisfactory degree of reliability. Test–retest reliability of posttraumatic symptoms measured was assessed using Pearson’s correlation. High correlations were found between scores for PTSD symptom severity total score ($r=0.80$, $p<0.001$), and also for the Reexperiencing ($r=0.70$, $p<0.001$), Avoidance and numbing ($r=0.71$, $p<0.001$), and Hyperarousal scale scores ($r=0.79$, $p<0.001$). Scott and Wertheimer coefficients for interclass correlations are shown in Table 1. In addition, Table 1 shows descriptive statistics for total sample, both for the total

score and for the PDS three subscales (Part 3), together with internal consistency coefficients (Cronbach alpha).

Table 2 presents Pearson’s correlation coefficients between the results obtained in PDS Part 3 and the IES, BDI, GHQ-28, and NHP.

Confirmatory factor analysis

For the three-factor model, the root mean square error of approximation (RMSEA) amounted to 0.06, the comparative fit index (CFI) was 0.94. The remaining indicator values were: $\chi^2(109)=310.50$ ($p<0.001$); Chi-square degrees of freedom ratio (χ^2/df): 2.85; goodness-of-fit indicator (GFI): 0.93. Strong intercorrelations between items located next to each other in separate factors were observed in the case of the following item pairs: #27 (trying not to think, talk, or have feelings about trauma) and #28 (trying to avoid activities, places, and people); #30 (loss of interest) and #31 (feeling distant or cut off); #31 and #32 (feeling emotionally numb); #37 (overly alert) and #38 (easily startled). For the five-factor model, RMSEA was 0.06, CFI was 0.93, $\chi^2(109)=326.53$ ($p<0.001$), χ^2/df was 3.00, and GFI was

Table 1. Descriptive statistics for the three samples

Study	Variable	Symptoms	M	SD	Minimum	Maximum	α	R_{TT}
Study 1 ($n=507$)	Number of symptoms	B	1.71	1.59	0	5	0.73	0.70
		C	2.24	2.12	0	7	0.78	0.63
		D	2.18	1.74	0	5	0.73	0.59
		Total score	6.13	4.71	0	17	0.88	0.77
	Symptoms severity	B	2.40	2.64	0	15	0.79	0.69
		C	3.72	3.99	0	19	0.80	0.70
		D	3.70	3.46	0	15	0.78	0.79
		Total score	9.80	8.73	0	47	0.89	0.81
Study 2 ($n=320$)	Number of symptoms	B	1.92	1.90	0	5	0.86	–
		C	2.18	2.40	0	7	0.86	–
		D	1.97	1.91	0	5	0.84	–
		Total score	6.07	5.68	0	17	0.94	–
	Symptoms severity	B	2.90	3.52	0	15	0.90	–
		C	3.51	4.61	0	21	0.89	–
		D	3.15	3.81	0	15	0.90	–
		Total score	9.55	11.13	0	48	0.95	–
Study 3 ($n=302$)	Number of symptoms	B	4.09	1.21	0	5	0.66	–
		C	5.42	1.71	0	7	0.69	–
		D	4.31	1.02	0	5	0.56	–
		Total score	13.76	3.32	0	17	0.81	–
	Symptoms severity	B	8.25	3.70	0	15	0.82	–
		C	11.57	5.09	0	21	0.77	–
		D	9.39	3.46	0	15	0.70	–
		Total score	29.06	10.47	0	51	0.88	–

α , Cronbach’s alpha value; R_{TT} , Scott-Wertheimer interclass correlation coefficient.

Table 2. Correlation coefficients (*r* Pearson) between PDS scores and other measures used in the student sample (Study 1)

	Number of symptoms (PDS)				Symptoms severity (PDS)			
	B	C	D	Total score	B	C	D	Total score
<i>IES (n = 507)</i>								
Intrusions	0.60*	0.51*	0.48*	0.60*	0.59*	0.51*	0.53*	0.62*
Avoidance	0.51*	0.58*	0.44*	0.60*	0.52*	0.59*	0.45*	0.61*
Total score	0.58*	0.60*	0.50*	0.65*	0.60*	0.60*	0.53*	0.66*
<i>NHP (n = 46)</i>								
Energy level	0.42*	0.36	0.13	0.34	0.39*	0.36	0.16	0.33
Pain	−0.08	−0.05	0.22	0.03	−0.09	−0.05	0.12	−0.01
Emotional reaction	0.48*	0.56*	0.45*	0.56*	0.39*	0.55*	0.45*	0.53*
Sleep	0.25	0.42*	0.30	0.38*	0.27	0.40*	0.32	0.38*
Social isolation	0.43*	0.58*	0.42*	0.55*	0.44*	0.61*	0.46*	0.57*
Physical abilities	0.31	0.41*	0.35	0.41*	0.39*	0.28	0.29	0.34
Total score	0.53*	0.65*	0.49*	0.63*	0.50*	0.65*	0.52*	0.63*
<i>BDI (n = 211)</i>								
Depression	0.35*	0.53*	0.47*	0.53*	0.41*	0.58*	0.50*	0.59*
<i>GHQ-28 (n = 166)</i>								
Somatic symptoms	0.28*	0.31*	0.33*	0.36*	0.30*	0.36*	0.40*	0.42*
Anxiety/insomnia	0.33*	0.41*	0.47*	0.47*	0.35*	0.45*	0.48*	0.51*
Social dysfunction	0.16	0.37*	0.36*	0.36*	0.25*	0.42*	0.39*	0.43*
Severe depression	0.20*	0.41*	0.32*	0.38*	0.27*	0.48*	0.36*	0.44*
Total score	0.29*	0.45*	0.44*	0.47*	0.35*	0.52*	0.49*	0.54*

PDS, Posttraumatic Diagnostic Scale; IES, Impact of Events Scale; NHP, Nottingham Health Profile; BDI, Beck's Depression Inventory; GHQ-28, General Health Questionnaire.

* $p < 0.01$.

0.93. Strong intercorrelations were observed between items #23 (reliving of the trauma) and #24 (nightmares); and also between #30 and #31.

Conclusions

The psychometric properties calculated on the basis of the data from the student sample may generally be considered as acceptable to very good. Test-retest reliability for PDS diagnosis and posttraumatic symptoms was relatively high. All the coefficients of reliability obtained were sufficiently high. High correlations with IES (all in excess of 0.50) confirmed the convergent validity of the adapted measure; however, this was less strongly the case with regard to the other scales. The results of CFA, despite some intercorrelations, may also be considered satisfactory; both models were generally well adjusted.

Study 2

Study 2 was conducted on a sample of 320 individuals exposed to various traumatic events. The age range was 17 to 59 years ($M = 28.72$, $SD = 9.17$). Of the participants, 174 were women (54.4%) and 146 were men

(45.6%). The sample consisted of three subsamples: 98 female victims of domestic violence, living temporally in domestic violence shelters (30.6%); 60 firemen (18.8%); 116 nurses from medical emergency service (36.2%); and 46 lifeguards from Poland's Voluntary Water Rescue Service (14.4%). All the participating victims of domestic violence had been exposed to assaults committed by their intimate partners, and all the firemen, nurses, and lifeguards had been exposed to traumatic events related to their profession (including giving aid to victims of serious accidents, participating in rescues, and retrieving victims' bodies). Of the total sample, 40.3% marked serious accident, fire, or explosion as the most bothering kind of traumatic event in their life. The prevalence levels of other most bothering traumatic events were non-sexual assault committed by a non-stranger (24.1%), life-threatening illness (10.9%), non-sexual assault committed by a stranger (6.6%), and sexual assault committed by a non-stranger (5%). Each of the remaining events was prevalent at a level no greater than 5%; 20.6% ($n = 66$) of the participants met all PTSD criteria according to PDS, but prevalence rates ranged from 42.9% among violence victims to 0% among lifeguards.

Table 3. Correlation coefficients (*r* Pearson) between PDS scores and other measures used in the trauma exposed sample (Study 2)

	Number of symptoms (PDS)				Symptoms severity (PDS)			
	B	C	D	Total score	B	C	D	Total score
<i>IES (n = 100)</i>								
Intrusions	0.75*	0.77*	0.78*	0.80*	0.85*	0.85*	0.88*	0.88*
Avoidance	0.78*	0.81*	0.82*	0.84*	0.82*	0.86*	0.88*	0.88*
Total score	0.78*	0.81*	0.82*	0.84*	0.85*	0.87*	0.90*	0.90*
<i>IES-R (n = 152)</i>								
Intrusions	0.37*	0.29*	0.40*	0.40*	0.40*	0.35*	0.42*	0.44*
Arousal	0.45*	0.48*	0.53*	0.56*	0.50*	0.55*	0.61*	0.63*
Avoidance	0.39*	0.39*	0.34*	0.43*	0.45*	0.45*	0.42*	0.50*
Total score	0.48*	0.45*	0.50*	0.55*	0.54*	0.52*	0.57*	0.62*
<i>GHQ-28 (n = 40)</i>								
Somatic symptoms	0.31	0.36	0.28	0.34	0.39	0.32	0.37	0.38
Anxiety/insomnia	0.14	0.17	0.26	0.20	0.26	0.22	0.34	0.29
Social dysfunction	0.31	0.31	0.22	0.30	0.37	0.36	0.32	0.37
Severe depression	0.25	0.29	0.28	0.29	0.33	0.27	0.31	0.32
Total score	0.29	0.32	0.30	0.32	0.38	0.33	0.38	0.39
<i>GHQ-12 (n = 58)</i>								
Total score	0.76*	0.76*	0.82*	0.88*	0.78*	0.80*	0.84*	0.88*

PDS, Posttraumatic Diagnostic Scale; IES, Impact of Events Scale; IES-R, Impact of Events Scale-Revised; GHQ-12 and GHQ-28, General Health Questionnaire.

* $p < .01$.

Method

Study 2 was carried out over the period 2008–2011. PDS was administered to all participants. In addition, other scales administered to various subsamples (see Table 3) included IES, GHQ-28, and also the two following questionnaires:

Impact of Events Scale Revised (IES-R) (Weiss & Marmar, 1996) is a revised version of IES. It contains seven additional items relating to the hyperarousal symptoms of PTSD, not included in the original IES. The items correspond directly to 14 of the 17 DSM-IV symptoms of PTSD. The Polish adaptation of this questionnaire was carried out by Juczyński and Ogińska-Bulik (2009). As is the case for IES, IES-R is exposure-specific. Therefore, we instructed the patients to refer to a specific traumatic event, which they chose from the events they had previously indicated in PDS (the Most Bothersome Event – PDS, Part 2).

General Health Questionnaire-12 (GHQ-12) is the 12-item version of GHQ, similarly to GHQ-28, a short screening measure to detect psychiatric disorders. It is used in research to assess the impacts of traumatic stress on general mental health. The full Polish adaptation of GHQ-12 has very good psychometric properties (Goldberg et al., 2001).

Results

Reliability and validity

Table 1 shows descriptive statistics for PDS total scores and for its subscales (Part 3), together with the internal consistency coefficients. Table 3 presents Pearson's correlation coefficients between the results obtained for PDS Part 3 and the remaining questionnaires (IES, IES-R, GHQ-12, GHQ-28).

Confirmatory factor analysis

For the three-factor model, RMSEA amounted to 0.07, with a CFI of 0.96. The remaining indicator values were as follows: $\chi^2(114) = 275.92$ ($p < 0.001$); χ^2/df : 2.42; GFI: 0.90. Strong intercorrelations were observed in the case of the following item pairs: #27 (trying not to think, talk, or have feelings about trauma) and #28 (trying to avoid activities, places, people); and also #37 (overly alert) and #38 (easily startled). For the five-factor model, RMSEA was 0.07, with CFI of 0.96; $\chi^2(109)$ was 275.62 ($p < 0.001$); χ^2/df was 2.36; GFI was 0.91. Strong intercorrelations were observed in the case of the following item pairs: #31 (feeling distant or cut off) and #32 (feeling emotionally numb), and also #36 (difficulty concentrating) and #37.

Conclusions

The psychometric properties observed in the sample of participants exposed to trauma may generally be considered as acceptable to very good. All the coefficients of reliability obtained were high enough to be satisfactory. Many statistically significant, positive correlations between the scale and other scales used in the study were obtained. The results of CFA may also be considered acceptable, despite the presence of intercorrelations for some pairs of items; both models were generally well adjusted.

Study 3

The goal of Study 3 was to examine the diagnostic agreement between PDS and a standardized SCID, as well as to assess the sensitivity and specificity of PDS. Therefore, we used the data from a sample of 302 subjects participating in the PTSD treatment program “TRAKT” for MVA victims (2008–2010; Popiel et al. in preparation). The subjects were aged between 18 and 82 years ($M = 37.60$, $SD = 13.17$); 73.2% ($n = 221$) were women. For all of the subjects, a major trauma (reflecting the DSM-IV criterion A for PTSD) was related to MVA.

Method

In Study 3, the Polish version of SCID for DSM-IV was used to measure diagnostic agreement. Participants underwent clinical interviews aimed at the assessment of PTSD (as the main diagnosis – the inclusion criterion for the treatment program) and comorbid disorders. Each interview was performed by a psychiatrist and followed the Polish version of SCID-I and SCID-II for DSM-IV-TR, Patient edition, Research version (First, Spitzer, Gibbon, & Williams, 2002/2012). The Module F – Anxiety disorders/PTSD, November 2008 version, was used. The PTSD module begins with a history of psychosocial stressors. Seventeen items are used to assess DSM symptoms constituting Criteria B, C, and D. Symptom duration (Criterion E), interference in daily functioning, and date of onset were also assessed. This module was administered as the criterion against which PDS was validated.

Results

Internal consistency, diagnostic agreement, and accuracy

Cronbach's alpha for the PDS total score and for its respective subscales are presented in Table 1. Of all the interviewed participants, 80.46% ($n = 243$) met all the DSM-IV PTSD criteria specified by SCID, and 89.4% ($n = 270$) met those specified by PDS. The convergent validity of the two measures of PTSD, SCID, and PDS is shown in Tables 4 and 5.

Table 4. Correlations (r Pearson) between PDS and the SCID-I/P clinical diagnosis (Study 3; $n = 302$)

	SCID-I P Symptoms severity	SCID-I P Number of PTSD symptoms	SCID-I P Diagnosis ^a
PDS—symptoms severity	0.65*	0.64*	0.50*
PDS—number of symptoms	0.66*	0.64*	0.56*

PDS, Posttraumatic Diagnostic Scale; PTSD, posttraumatic stress disorder; SCID, Structured Clinical Interview for DSM.

^aEta coefficient.

* $p < 0.01$.

We also examined the sensitivity and specificity of the PDS. When comparing PTSD diagnoses formulated on the basis of PDS and SCID in Study 3, we observed that test sensitivity amounts to 95%, while for test specificity the figure is 36%. The positive and negative predictive values are 86 and 66%, respectively.

Confirmatory factor analysis

For the three-factor model, RMSEA amounted to 0.09, with a CFI of 0.93; $\chi^2(116)$ was 413.95 ($p < 0.001$); χ^2/df was 3.57; and GFI was 0.86. For the five-factor model, RMSEA was 0.06, CFI was 0.96; $\chi^2(109)$ was 242.41 ($p < 0.001$); χ^2/df was 2.22; and GFI was 0.91. No inter-correlations between items within different factors were observed.

Conclusions

The majority of the observed psychometric properties in the sample of treatment-seeking patients may in general be considered as acceptable to very good. Specifically, in relation to diagnostic agreement, all the obtained coefficients are sufficiently large, confirming the convergent validity of the adapted measure. The positive and negative predictive values of the PDS diagnosis reach acceptable levels. However, although the level of specificity indicated may be considered as very good, the sensitivity level is relatively low. The CFA results may be considered as satisfactory. Although the RMSEA value for the three-factor model indicated a poor fit, the remaining indices were within acceptable ranges. However, better fit was observed for the five-factor model.

Discussion

The major aim of the studies presented here was to examine the psychometric properties of the Polish version of PDS—and additionally to test its factor structure—with regard to the Polish population. Among the strengths of our studies is the inclusion of three different

Table 5. Correlations (*r* Pearson) between PDS and the SCID-I P symptom clusters (Study 3; *n* = 302)

	SCID-I P Number of cluster B symptoms	SCID-I P Number of cluster C symptoms	SCID-I P Number of cluster D symptoms
PDS—number of cluster B symptoms	0.50*	0.40*	0.37*
PDS—number of cluster C symptoms	0.39*	0.58*	0.45*
PDS—number of cluster D symptoms	0.33*	0.28*	0.48*

PDS, Posttraumatic Diagnostic Scale; SCID, Structured Clinical Interview for DSM.

**p* < 0.01.

samples, the range of types of traumatic experiences to which individuals had been exposed, the variety of measures used to assess validity symptom severity scores, and also the possibility of comparing the PTSD diagnoses obtained from the PDS with those obtained from a structured diagnostic interview (SCID).

In general, it can be stated that the Polish version of this scale has satisfactory psychometric characteristics. Reliability indicators obtained through the analysis of the data had generally high values. Test–retest procedure revealed that the PTSD diagnosis, both according to the PDS and its subscales (Number of symptoms and symptom severity), demonstrates good stability over time (Table 1). The coefficients of internal consistency, Cronbach’s alpha (0.70–0.95), are similar and even, in some cases, superior to those obtained in the original study on PDS, and in studies based on non-English language versions of PDS (e.g., Griesel et al., 2006). Interestingly, the data on internal consistency from the trauma-exposed group shows higher values for Cronbach’s alpha (0.84–0.95) than in the student (0.73–0.89) and the patient (0.70–0.88) groups. They are also higher than in the original PDS study and the German version of PDS.

The indicators of validity can also be considered generally satisfactory; PDS total scores are significantly correlated with total scores of almost all other psychopathology measures (0.29–0.90); however, correlations for certain subscales are low or even non-significant.

These results can be interpreted specifically in terms of convergent or divergent validity. For example, in Study 2 we can see (as shown in Table 3) particularly high correlations with IES total score (0.80–0.90), and also with GHQ-12 (0.88), measuring general psychiatric symptomatology. Thus these findings may be seen as providing evidence for excellent convergent validity of the PDS version presented here. However, the correlation coefficients for BDI are lower (0.35–0.59) than those obtained in the original study. Given that the Polish version of BDI has not yet been fully standardized, these results may serve as a further argument in favor of the validity of the Polish version of PDS. The low correlations between frequently comorbid, yet non-identical symptoms, permit their interpretation in terms of dis-

criminant validity. It is also worth noting that all the correlations with IES, IES-R, BDI, and GHQ-12 are statistically significant. Somewhat more diverse results were obtained for GHQ-28 and NHP. Admittedly, while in Study 1 all correlation coefficients for the GHQ-28 are positive and statistically significant (Table 2), all of the correlations in Study 2 are non-significant (Table 3). In the case of NHP, non-significant results were observed consistently for the Pain subscale, which measures physical pain associated with specific situations.

The high sensitivity of the Polish version of PDS, together with the significant correlations with symptom assessment by SCID-I, suggests that the Polish version of PDS has potential as a useful tool for research in PTSD – high scores in the questionnaire indicate a high probability of suffering from PTSD. PDS users should however take into consideration the somewhat low specificity index on the basis of the presented data, indicating the possibility that PTSD diagnoses made on the basis of that, would not be confirmed by clinical assessment (this is coherent with the remark of Foa, suggesting the use of PDS as a screening tool rather than as a final diagnosis; see also Keane, Weathers, & Foa, 2000). This conclusion is also supported by the fact that PTSD prevalence rates obtained in Studies 1 and 2 significantly exceed those obtaining for the general population, for example, the current prevalence in European countries, scores about 2% (Darves-Bornoz et al., 2008).

The results of CFA confirmed both the three-factor structure of the PDS and the most recent five-factor proposition. Indicator values in three presented studies attained, in a majority of cases, acceptable levels (see Tabachnick & Fidell, 2007). However, the results of CFA also revealed that some PDS item pairs (Studies 1 and 2), particularly items corresponding with cluster C symptoms, #27 (trying not to think, talk, or have feelings about trauma) and #28 (trying to avoid activities, places, people), as well as two items from the D cluster, #37 (overly alert) and #38 (easily startled), intercorrelate strongly. This is suggestive of either item content similarity or else of the frequent co-occurrence of these specific symptoms of PTSD.

One of the limitations of this study lies in the use of structured interviews only in the sample of patients seeking treatment (it was not possible to use a tool of this kind in the student or trauma-exposed samples). However, it can be concluded that the results of the studies presented here provide strong general evidence that Polish version of the PDS has satisfactory psychometric characteristics.

Acknowledgments

Studies 1 and 2 were supported by internal funds of the Faculty of Psychology at University of Warsaw (M. Dragan, donation number: BST154543, and M. Lis-Turlejska, donation number: BST1445/22). Study 3 was supported by Grant PL0088 "Psychological causes and consequences of traffic accidents" from Financial Mechanism Committee established by Iceland, Liechtenstein, and Norway through EEA Mechanism and the Polish Minister of Science and Higher Education (A. Popiel).

Conflict of interest and funding

There is no conflict of interest in the present study for any of the authors.

References

- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- Arbuckle, J. L. (2008). *AMOS 17.0.1*. Springhouse, PA: Amos Development Corporation.
- Baschnagel, J. S., O'Connor, R. M., Colder, C. R., & Hawk, L. W. (2005). Factor structure of posttraumatic stress among Western New York undergraduates following the September 11th terrorist attack on the World Trade Center. *Journal of Traumatic Stress*, 6, 677–684.
- Beck, A. T., Ward, C., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, 4, 561–571. doi:10.1001/archpsyc.1961.01710120031004
- Czapiński, J. (1998). *Jakość życia Polaków w czasie zmiany społecznej* [Poles' quality of life]. Warszawa: ISS UW.
- Darves-Bornoz, J.-M., Alonso, J., de Girolamo, G., de Graaf, R., Haro, J.-M., Kovess-Masfety, V., et al. (2008). Main traumatic events in Europe: PTSD in the European Study of the Epidemiology of Mental Disorders Survey. *Journal of Traumatic Stress*, 21, 455–462. doi:10.1002/jts.20357
- Elhai, J. D., Biehn, T. L., Armour, C., Klopfer, J. J., Frueh, B. C., & Palmieri, P. A. (2011). Evidence for a unique PTSD construct represented by PTSD's D1-D3 symptoms. *Journal of Anxiety Disorders*, 25, 340–345. doi:10.1016/j.janxdis.2010.10.007
- First, M., Spitzer, R. L., Gibbon, M., & Williams, J. (2002/2012). *Structured clinical interview for DSM-IV-TR axis I disorders, research version*, Patient Edition. New York: Biometrics Research, New York State Psychiatric Institute. Polish version in press.
- Foa, E. B. (1995). *Posttraumatic Diagnostic Scale (PDS) manual*. Minneapolis, MN: NSC Pearson.
- Foa, E. B., Cashman, L., Jaycox, L., & Perry, K. (1997). The validation of a self-report measure of posttraumatic stress disorder: The Posttraumatic Diagnostic Scale. *Psychological Assessment*, 9, 445–451. doi:10.1037/1040-3590.9.4.445
- Goldberg, D., Williams, P., Makowska, Z., & Merecz, D. (2001). *Podręcznik dla użytkowników kwestionariuszy GHQ-12 i GHQ-28* [Manual for the users of GHQ-12 and GHQ-28 questionnaires]. Łódź: Instytut Medycyny Pracy.
- Griesel, D., Wessa, M., & Flor, H. (2006). Psychometric qualities of the German version of the Posttraumatic Diagnostic Scale (PTDS). *Psychological Assessment*, 18, 262–268. doi:10.1037/1040-3590.18.3.262
- Hearn, M., Ceschi, G., Brillion, P., Fürst, G., & Van der Linden, M. (2011). A French adaptation of the Posttraumatic Diagnostic Scale. *Canadian Journal of Behavioural Science*, 44, 16–28. doi:10.1037/a0025591
- Hensen, M., Armour, Ch., & Elklit, A. (2012). Assessing a dysphoric arousal model of acute stress disorder symptoms in a clinical sample of rape and bank robbery victims. *European Journal of Psychotraumatology*, 3, 18201. doi:10.3402/ejpt.v3i0.18201
- Horowitz, M., Wilner, N., & Alvarez, W. (1979). Impact of Event Scale: A measure of subjective distress. *Psychosomatic Medicine*, 41, 209–218.
- Juczyński, Z., & Ogińska-Bulik, N. (2009). Pomiar zaburzeń po stresie traumatycznym – polska wersja Zrewidowanej Skali Wpływu Zdarzeń [Polish version of IES-R]. *Psychiatria*, 1, 15–25.
- Karanci, A. N., İşikli, S., Aker, A. T., Gül, E. I., Erkan, B. B., Özko, H., et al. (2012). Personality, posttraumatic stress and trauma type: factors contributing to posttraumatic growth and its domains in a Turkish community sample. *European Journal of Psychotraumatology*, 3, 17303. doi:10.3402/ejpt.v3i0.17303
- Keane, T. M., Weathers, F. W., & Foa, E. B. (2000). Diagnosis and assessment. In E. B. Foa, T. M. Keane, & M. J. Friedman (Eds.), *Effective treatments for PTSD*. London: Guilford Press.
- King, D. W., Leskin, G. A., King, L. A., & Weathers, F. W. (1998). Confirmatory factor analysis of the Clinician-Administered PTSD Scale: Evidence for the dimensionality of posttraumatic stress disorder. *Psychological Assessment*, 10, 90–96. doi:10.1037/1040-3590.10.2.90
- Lis-Turlejska, M. (2004). Rozpowszechnienie traumatycznych zdarzeń oraz objawów potraumatycznych w nieklinicznej próbie studentów wyższych uczelni [Prevalence of traumatic events in a non-clinical sample of students]. In J. Strelau (Ed.), *Osobowość a ekstremalny stres* [Personality and extreme stress]. (pp. 100–118). Gdańsk: GWP.
- McEwen, J. (1988). The Nottingham Health Profile. In S. R. Walker, & R. M. Rosser (Eds.), *Quality of life: Assessment and application* (pp. 95–111). Oxford: MTP Press.
- Norris, A. E., & Aroian, K. J. (2008). Assessing reliability and validity of the Arabic language version of the Post-traumatic Diagnostic Scale (PDS) symptom items. *Psychiatry Research*, 3, 327–334. doi:10.1016/j.psychres.2007.09.005
- Novy, D. M., Stanley, M. A., Averill, P. M., & Daza, P. (2001). Psychometric comparability of English and Spanish language measures of anxiety and related affective symptoms. *Psychological Assessment*, 13, 347–355. doi:10.1037/1040-3590.13.3.347
- Odenwald, M., Lingenfelder, B., Schauer, M., Neuner, F., Rockstroh, B., Hinkel, H., et al. (2007). Screening for posttraumatic stress disorder among Somali ex-combatants: A validation study. *BMC Conflict and Health*, 1, 10. doi:10.1186/1752-1505-1-10
- Popiel, A., Prąglowska, E., Zawadzki, B., & Teichman, Y. (in preparation). Effectiveness of prolonged exposure vs paroxetine vs combined treatment in the treatment of PTSD - results of RCT. Unpublished manuscript.
- Powell, S., & Rosner, R. (2005). The Bosnian version of the international self-report measure of posttraumatic stress disorder, the Posttraumatic Stress Diagnostic Scale, is reliable and

- valid in a variety of different adult samples affected by war. *BMC Psychiatry*, 5, 11. doi:10.1186/1471-244X-5-11
- Simms, L. J., Watson, D., & Doebbell, B. N. (2002). Confirmatory factor analyses of posttraumatic stress symptoms in deployed and nondeployed veterans of the Gulf War. *Journal of Abnormal Psychology*, 111, 637–647. doi:10.1037/0021-843X.111.4.637
- Spitzer, R. L., Williams, J. B. W., Gibbon, M., & First, M. B. (1990). *Structured clinical interview for DSM-III-R, Patient Edition/Non-patient Edition*, (SCID-P/SCID-NP). Washington, DC.: American Psychiatric Press, Inc.
- SPSS Inc. (2009). *PASW STATISTICS 17.0*. Chicago: SPSS Inc.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics*. Boston: Allyn and Bacon.
- Weiss, D. S., & Marmar, C. R. (1996). The Impact of Event Scale-Revised. In J. P. Wilson, & T. M. Keane (Eds.), *Assessing psychological trauma and PTSD* (pp. 399–411). New York: Guilford.
- Wrześniewski, K. (2000). Development of a Polish Version of the Nottingham Health Profile. *QoL Newsletter*, 25 (July–December), p. 10.
- Yufik, T., & Simms, L. J. (2010). A meta-analytic investigation of the structure of posttraumatic stress disorder symptoms. *Journal of Abnormal Psychology*, 119, 764–776. doi:10.1037/a0020981

***Maja Lis-Turlejska**

Warsaw School of Social Sciences and Humanities
Faculty of Psychology
ul. Chodakowska 19/31
PL-03-815 Warsaw, Poland
Email: mlis-turlejska@swps.edu.pl